

## **FMTP POWER & NETTEDAUTOMATION**

# **PROTECTION AND CONTROL WITH IEC 61850**

## **4 DAYS SEMINAR WITH PRACTICAL DEMONSTRATIONS**

### **STOCKHOLM, SWEDEN**

**22-25 FEBRUARI 2016**

**19-22 SEPTEMBER 2016**

**MR. KARLHEINZ SCHWARZ & MR. ANDREA BONETTI**

With focus on protection and control in HV/MV substations  
using GOOSE, SV, SCADA and SCL Language



**M.Sc. Andrea Bonetti**  
Member of IEC TC95:  
Measuring relays and protection  
equipment  
IEC 1906 Award - 2013



**Dipl.- Ing. Karlheinz Schwarz**  
Editor of IEC 61850; Member of IEC TC57:  
Power systems management and  
associated information exchange  
Member of IEC TC88:  
Wind turbines (IEC 61400-25)  
IEC 1906 Award - 2007



The IEC 61850 applied for several years to many new substation designs all over the world. It During the seminar, truly experienced and vendor independent engineers will help you to see and understand how use the core parts of the IEC 61850 standard are applied in substation design, monitoring, protection and control applications. You will learn from a senior protection engineer, how the protection system will improve and understand the crucial lessons learned since the first projects with IEC 61850 in 2004.

### **Seminar contents:**

- **IEC 61850 Introduction** (Edition 1, 2, and 2.1) and experience after 10 years in operation.  
Where are we today?
- **Return of experience**, applications and practical demonstrations:
  - Protection and Control in Substation Automation
  - Engineering and Configuration
  - Maintenance
  - Monitoring and SCADA system
  - Specification of the IEC 61850 protection and control system.
- **Through the practical demonstrations you will learn:**
  - To handle **IEC 61850 relay protections from different vendors** and their software tools; to be able to efficiently manage flexibility in engineering and interoperability.
  - To use the **state of the art IEC 61850 testing tools and equipment** to efficiently detect the technical problems and work-out their solutions.
  - To **understand SCL files, setup clients and servers for MMS communication** to SCADA and RTU Systems



**All the presentations are supported by practical examples or demonstrations.**

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### Program:

#### Day 1 - IEC 61850 Introduction and experience after 10 years in operation. Where are we today?

##### Objectives:

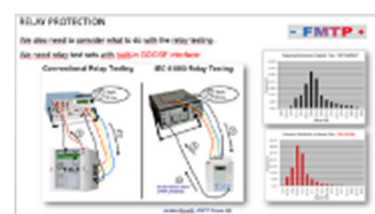
- Introduction of basic concepts (information modeling, information models, information exchange, system configuration)
- Explanation of the different parts of the standard, the mapping (Logical Nodes, Logical Devices...), SCL language, types of SCL files, type of IEC 61850 documents (PICS, PIXIT...).
- Information on Client/Server (ACSI/MMS), Sample Values and GOOSE.
- IEC 61850 Edition 1, Edition 2, and Edition 2.1...What are they? What are the main improvements?
- Ten years of Experience with IEC 61850: Lessons learned.
- Impact of IEC 61850 standard on equipment and tools like Protection and Control Devices (IED), Merging Units, Test equipment, design, configuration, SCADA.



#### Day 2 - Day 4 - Return of experience, applications and practical demonstrations:

##### Objectives:

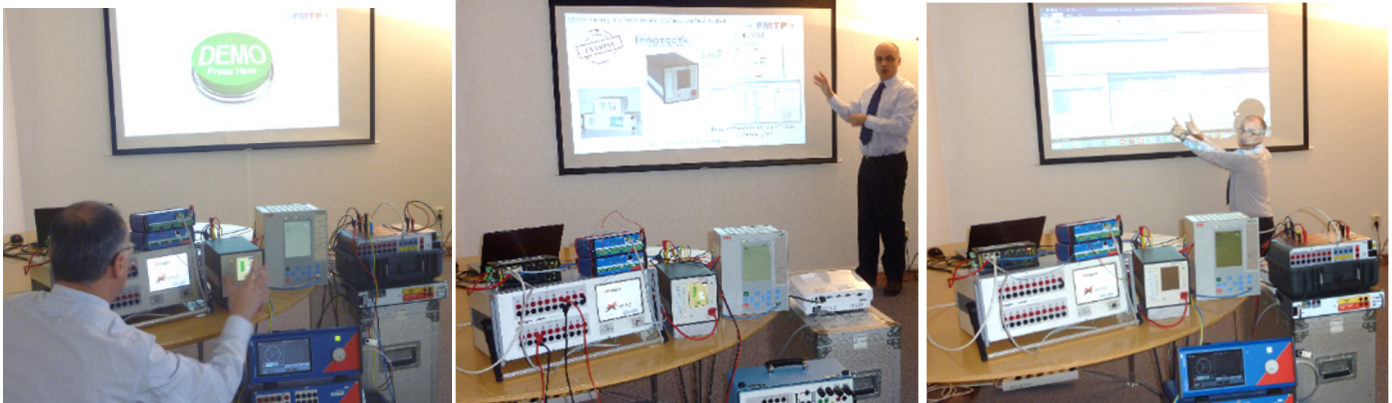
- Substation automation protection and control philosophy, vertical (MMS) and horizontal communication (GOOSE, SV), protection schemes, interlocking.
- Real time performances, protection security and dependability with GOOSE and conventional technologies.
- Different types of GOOSE messages for different types of "substation signals"
- Types of Network topology (Ring or redundant with PRP, HSR)
- Engineering process, Bottom-Up, Top-Down – Where are we now? What to expect?
- Process Bus (sampled values) today and expectations for the future. Interoperability, responsibility and testability. The role of different IEC groups: IEC TC 57 (Power systems management and associated information exchange), TC 95 (Measuring relays and protection equipment) and TC 38 (Instrument transformers).
- Interoperability in substations: What we have done so far, which types of problems have been met and the solutions to find them and fix them. Turn-key vs multi-vendor projects.
- Which kind of test equipment are available, test tools, how to use them. PROs and CONS (Testing protection and interlocking (GOOSE)).
- Network analysis and Testing Client/Server Publisher/Subscriber
- Vertical communication, "engineering of SCADA System"
- Station HMI (SCADA, RTU)
- Communication between substations and remote control center (IEC 60870-5-104, DNP3, ....)
- Importance of event driven reporting
- Signal list to the SCADA System. Report Control blocks.
- How to build and configure Gateways from IEC 61850 to IEC 60870-5-104



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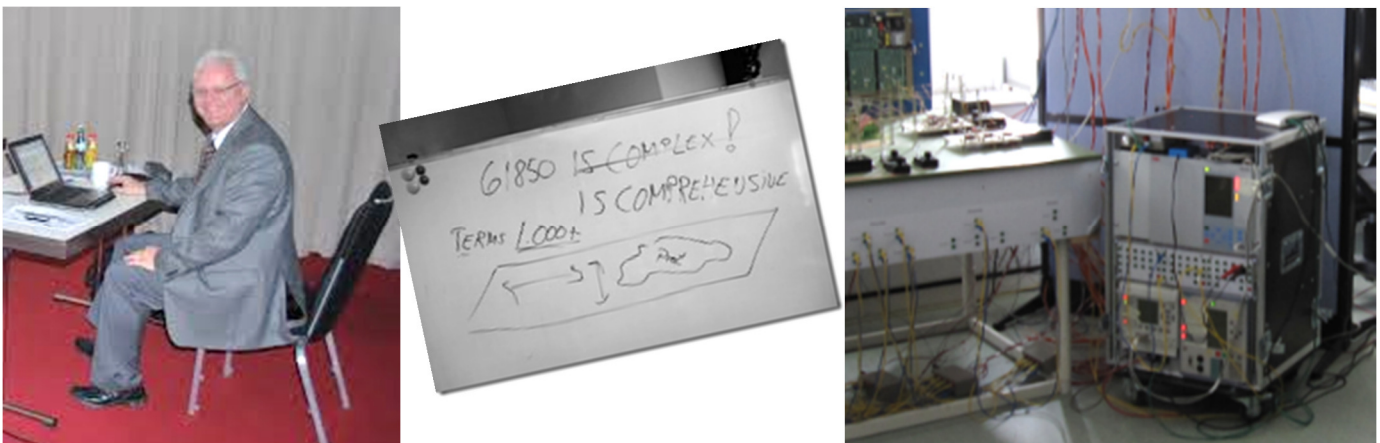
### Practical demonstrations on relay protection

- Example of configuration and testing of protection IEDs for IEC 61850 GOOSE application.
- Example of engineering/configuration and testing of interoperability between IEDs from different manufacturers
- Examples on how to identify IEC 61850 interoperability problems and how to solve them. How to choose and use the right tool for the right situation



### Practical demonstration on SCADA configuration

- Examples of Implementation, configuration and use case on SCADA System (Client) / IED Protection and Monitoring IED (Servers).  
A demo software for client/server and publisher/subscriber (running on Windows) will be provided for every attendee.



### Who should attend?

- Protection and Electrical Engineers (protection, control, engineering, SCADA, asset managers)
- System integrators
- Product managers of vendors
- R&D engineers
- Maintenance personnel
- Experts responsible for network infrastructure



## FMTP POWER & NETTEDAUTOMATION

### The Experts teaching

#### FMTP Power AB – Mr. Andrea Bonetti

Our expert Andrea Bonetti, was born in Bergamo, Italy, 1966. He graduated in electrical engineering (MSEE) at Università La Sapienza of Rome, Italy in 1993. Andrea worked for 10 years as high voltage protection engineer for ABB Substation Automation Products in Västerås, Sweden. Since the first years of the IEC 61850 standard, Andrea gave local and remote support in several projects with IEC 61850 implementations for protection and control applications with ABB 670 IEDs, where testing and interoperability issues were encountered. Andrea was part of the International ABB teaching team to spread the knowledge of IEC 61850 worldwide.

Andrea also worked at Programma/Megger as product manager for relay test equipment. He worked on the development of IEC 61850 compatible relay test set and software tools, resulting into patented solutions.

After having worked at STRI AB as technical manager for the Substation Automation Unit, Andrea works now at FMTP AB as technical manager.

Andrea is member of the IEC TC 95 – MT4 technical committee (“Measuring relays and protection equipment”) since 2006. During year 2013 Andrea has received the IEC 1906 Award.



#### FMTP Power AB

Associated specialists from the Power Industry with knowledge and experience in Protective relays, Smart Grid, IEC 61850, Circuit breakers, battery testing, ... All of them have more than 20 years' experience in Power Industry from the G5 group (ABB, ALSTOM, GE, SCHNEIDER, SIEMENS). They are involved in many standardization activities within IEC since 2002. They have consulting activities and are organizing worldwide, customer specific Seminars and training courses.

[www.fmtppower.com](http://www.fmtppower.com)



Watch the movie presentation: <http://www.screencast.com/t/81zcdGvfvm>

#### NettedAutomation GmbH – Mr. Karlheinz Schwarz

Our expert, Dipl.-Ing. Karlheinz Schwarz (president of Schwarz Consulting Company, SCC, and owner of NettedAutomation GmbH; Karlsruhe/Germany) specializing in distributed automation systems. He received his Diplom-Ingenieur from University Siegen (Germany) in 1982. He is involved in many international standardization projects (IEC 61850 – utility automation, DER, hydro power, IEC 61400-25 – wind power, IEC 61158 – Fieldbus, ISO 9506 – MMS, ...) since 1984. He is engaged in representing main industry branches in the international standardization of real-time information modelling, configuration, and exchange systems. Core services are consulting and training of utility personal, system integrators, consultants, and vendors. He has educated more than 3.600 experts from more than 800 companies and more than 80 countries. The training courses are considered to be outstanding. Mr. Schwarz is a well-known authority on the application of mainstream information and communication technologies in the utility industry and general automation domain.

<http://www.blog.iec61850.com>

Personal experience, capabilities, of Karlheinz Schwarz ... introduction on IEC 61850, training modules, feedback from attendees, list of companies, countries, and pictures can be found here:

<http://nettedautomation.com/download/Sem/fra14/General-Training.pdf>



Watch the movie presentation: <http://www.screencast.com/t/wzw53AgPq>

## FMTP POWER & NETTEDAUTOMATION

### PLACE OF SEMINAR:

KTH - ROYAL INSTITUTE OF TECHNOLOGY  
Brinellvägen 8, 114 28 Stockholm

### DATES:

- 22-25 Februari 2016
- 19-22 September 2016



### Proposed Hotel:

Elite Hotel Arcadia Stockholm ( 500m from KTH)  
Körsbärsvägen 1, 114 23 Stockholm  
Tel: 08-566 215 00



## Registrations

Seminar fee: **1850 Euro** per attendee for the entire seminar (4days) - plus taxes if applicable.

It covers access to seminar and trainings, papers & proceeding and includes lunch and coffee breaks.

For contact Registrations & Payment or Travel & Living arrangements

### Please contact:

#### FMTP Power AB

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Germany

## Additional services offered by FMTP Power and NettedAutomation

We offer also in-house hands-on training courses with protection relays from main manufacturers, test tools, engineering and configuration tools, SCADA solutions, and Gateways between IEC 61850 and IEC 60870-5- and DNP3.

Our in-house hands-on training courses are the most efficient way to speed up and to get exactly what you need:

- focuses on your needs
- from practice for practice
- link the standard with your own daily practice
- exchanging and sharing practical experience
- no competitors are listening to your plans
- vendor independent
- private and confidential questions and answers,
- no travel time and travel cost for your people
- we come out to you – all over the world

The above described 3-days seminar could also be conducted in-house.

Let us know your needs and we will provide you a quote.

### Contact:

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Karlheinz Schwarz: [karlheinz.schwarz@nettedautomation.com](mailto:karlheinz.schwarz@nettedautomation.com)